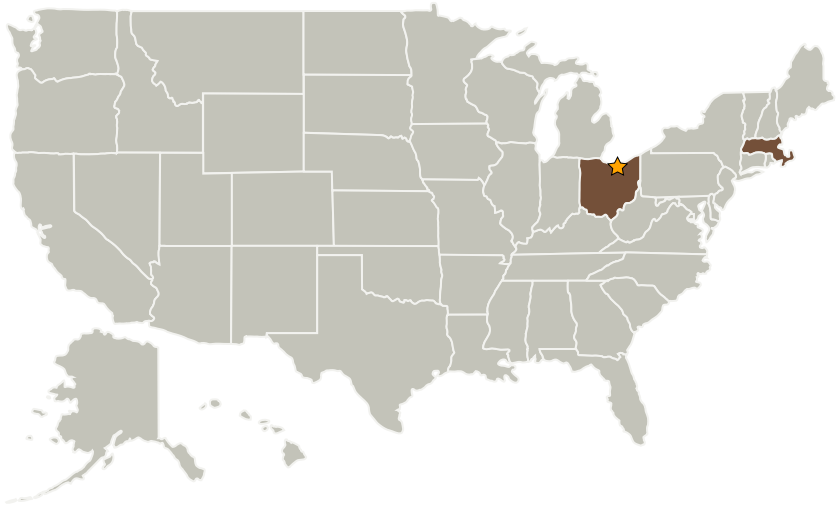
Compact Tunable High-Efficiency Entangled Photon Source, Phase I

Completed Technology Project (2007 - 2007)

Project Introduction

MagiQ proposes to develop a compact tunable high-efficiency low-power-consumption entangled photon source. The source, based on inter-Fabry-Perot-cavity Spontaneous Parametric Down Conversion (SPDC) of pump light in periodically polled non-linear waveguides (PPLN or PPKTP) is expected to provide high spectral density flux of entangled photon pairs. The output wavelength will be within the C-band (1529 to 1563 nm) permitting usage of plethora of components developed for classical communication links. The Fabry-Perot setup will provide for the narrow frequency output -- an attractive feature for low power communications in presence of the ambient light. Waveguide-based inter-cavity SPDC is the main proposed innovation. The entangled output wavelength tuning will be achieved by changing the wavelength of the pump light. The wavelength agility will facilitate device usage in the reconfigurable communications links -- a feature that can be very important in the planetary exploration systems involving small robotic explorers. Breadboard demonstration of the time-bin entanglement setup will be completed during Phase I of the project; delivery of a fully functional device producing both, time-bin and polarization entanglement is expected at the end of Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
MagiQ Technologies, Inc.	Supporting Organization	Industry	Somerville, Massachusetts

Primary U.S. Work Locations	
Massachusetts	Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.5 Revolutionary Communications Technologies
    - TX05.5.2 Quantum Communications